WHAT IS CLAIMED IS:

1. A linear motor, comprising:

a magnet;

a coil; and

a jacket having an inside comb-shaped member extending along a driving direction, wherein the coil is engaged by teeth of said comb-shaped member and wherein a cooling medium is flown through an inside space enclosed by said jacket.

2. A linear motor according to Claim 1, wherein said comb-shaped member includes base portions provided on mutually opposed inside faces of said jacket and formed in parallel to the driving direction and to be opposed to each other, and a pillar-like portion for connecting said base portions, wherein the coil is floatingly supported by said base portions while it is held fixed by said pillar-like portion with respect to the driving direction.

3. A linear motor according to Claim 1, wherein said linear motor includes a plurality of coils arrayed along the driving direction with partial overlapping with each other, wherein each coil has a bent end portion to avoid mutual interference of the partially overlapped portions of the coils, and wherein the coils are disposed with their central

portions placed substantially at the same level.

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4. A linear motor according to Claim 3, wherein said jacket has a central small-thickness portion with an outside recessed portion, wherein the bent end portions of the coils are disposed at the recessed portion, and wherein the central small-thickness portion is reinforced by the recessed portion.

5. A linear motor according to Claim 1, wherein said jacket serves as a guide for an element to be driven by said linear motor.

6. A stage system, comprising:

a movable stage;

a linear motor having a magnet and a coil, for driving said stage; and

a jacket having an inside comb-shaped member extending along a driving direction, wherein the coil is engaged by teeth of said comb-shaped member and wherein a cooling medium is flown through an inside space enclosed by said jacket.

7. An exposure apparatus, comprising:

a movable stage for holding a substrate thereon;

a linear motor having a magnet and a coil,

Sub a9 cont.

for driving said stage; and

a jacket having an inside comb-shaped member extending along a driving direction, wherein the coil is engaged by teeth of said comb-shaped member and wherein a cooling medium is flown through an inside space enclosed by said jacket.

8. A device manufacturing method, comprising the steps of:

applying a photosensitive material onto a substrate;

exposing the substrate by use of an exposure apparatus including a movable stage for holding a substrate thereon, a linear motor having a magnet and a coil, for driving said stage, and a jacket having an inside comb-shaped member extending along a driving direction, wherein the coil is engaged by teeth of said comb-shaped member and wherein a cooling medium is flown through an inside space enclosed by said jacket; and

developing the exposed substrate.

9. A linear motor, comprising:

a magnet;

a coil; and

a jacket having a reinforcement portion extending in parallel to a driving direction, wherein

SUB a9 cont.

said coil is enclosed by said jacket and wherein a cooling medium is flown through an inside space of said jacket.

10. A linear motor according to Claim 9, wherein said reinforcement portion is formed on an outside face of said jacket.

11. A linear motor according to Claim 9, wherein said reinforcement portion is formed at a position not interfering with relative motion of said magnet and said coil.

12. A linear motor according to Claim 9, wherein said reinforcement portion is made of one of aluminum, ceramics and resin.

13. A linear motor according to Claim 9, wherein said reinforcement portion is made integral with said jacket, and wherein said reinforcement portion is defined by a portion having a protruded shape with respect to a level of a portion of said jacket where said magnet and said coil are opposed to each other.

14. A linear motor according to Claim 13, wherein said jacket and said reinforcement portion being integral with each other are made of one of ceramics

and resin.

Sub a9 cont.

15. A linear motor according to Claim 13, wherein the protruded shape portion of said jacket is defined by an inside recessed portion of said jacket where a portion of the coil is placed.

16. A linear motor according to Claim 9, wherein at least one of an upper half and a lower half of a section of said jacket taken along a plane perpendicular to the driving direction has a recessed shape portion.

17. A stage system, comprising:

a movable stage;

a linear motor having a magnet and a coil, for driving said stage; and

a jacket having a reinforcement portion extending in parallel to a driving direction, wherein said coil is enclosed by said jacket and wherein a cooling medium is flown through an inside space of said jacket.

18. An exposure apparatus, comprising:

a movable stage for holding a substrate thereon;

a linear motor having a magnet and a coil,

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for driving said stage; and

a jacket having a reinforcement portion extending in parallel to a driving direction, wherein said coil is enclosed by said jacket and wherein a cooling medium is flown through an inside space of said jacket.

19. A device manufacturing method, comprising the steps of:

applying a photosensitive material onto a substrate;

exposing the substrate by use of an exposure apparatus having a movable stage for holding a substrate thereon, a linear motor having a magnet and a coil, for driving said stage, and a jacket having a reinforcement portion extending in parallel to a driving direction, wherein said coil is enclosed by said jacket and wherein a cooling medium is flown through an inside space of said jacket; and

developing the exposed substrate.

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